

**REMARKS**

**Status of the Claims**

Claims 1, 10, 19, 23, 32, 34, 41 and 50 have been amended by this Reply. Claims 6, 15, 20, 28, 37, 46 and 55 have been cancelled. New claim 59 has been added.

Support for the amendments to the claims can be found throughout the disclosure and original claims, as filed. Specifically, support for the subject matter of new claim 59, which was also added to claims 10, 23, 32, 41 and 50, can be found, for example, at page 9, lines 3 to 7, of the original disclosure. Accordingly, no new matter has been added by this Amendment.

**Rejections Under 35 U.S.C. § 103**

*Schwab*

The Examiner has rejected claims 1-5, 8-14, 17-27, 30-36, 39-45, 48-54 and 57-58 under 35 U.S.C. 103 as being unpatentable over U.S. Patent No. 5,669,938 ("Schwab"), for the reasons provided at pages 2-3 of the outstanding Office Action. Applicants respectfully traverse this rejection.

Independent claims 1, 10, 23, 32, 41 and 50 have been amended to recite the limitations of claims 6, 15, 28, 37, 46, and 55, which were not rejected under Schwab alone. For at least this reason, the rejection of Schwab, taken alone, no longer applies to claims 1, 10, 23, 32, 41 and 50, and the rejection should be withdrawn.

Regarding claims 19, 21 and 22, independent claim 19 recites,

A hydrocarbon additive for a middle distillate fuel containing an oxygenate, the additive comprising a polar functional group and a tertiary hydrogen beta to the functional group, wherein the polar functional group of the hydrocarbon is selected from the group consisting of the characteristic moieties of the following:

alcohols, alkyl esters, carboxylic acids, ketones, aldehydes, amines, amine esters, nitro-, and nitrile-compounds, phenols, and mixtures of one or more of the foregoing.

Schwab teaches fuel compositions comprising organic nitrate ignition improvers comprising nitrate esters. See column 2, line 55 to column 3, line 16. However, Schwab fails to teach or suggest the hydrocarbon additive of amended claim 19. Accordingly, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

Claims 21 and 22 depend from, and therefore include the limitations of, claim 19. For at least this reason, Schwab also fails to teach the limitations of these claims.

Schwab in view of Heneghan

The Examiner has rejected claims 6, 7, 15, 16, 28, 29, 37, 38, 48, 47, 55 and 56 under 35 U.S.C. 103 as being unpatentable over Schwab in view of U.S. Patent No. 6,475,252 ("Heneghan"), for the reasons provided at pages 3-4 of the outstanding Office Action. Applicants respectfully traverse this rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See M.P.E.P., § 2143.

Claims 6, 15, 28, 37, 46 and 55 have been cancelled. As mentioned above, independent claims 1, 10, 23, 32, 41 and 50 have been amended to include the limitation of cancelled claims 6, 15, 28, 37, 46, and 55, and thus now recite, among other things, that "the fuel has a sulfur content of about 20 ppm or less."

Schwab teaches a water-in-oil emulsion fuel composition which comprises a major proportion of a hydrocarbonaceous middle distillate fuel, water and minor emission reducing amount of at least one fuel-soluble organic nitrate ignition improver dissolved therein. See column 1, lines 62-67. As admitted by the Examiner, Schwab does not expressly teach a sulfur content of about 20 ppm or less.

To supply the missing teaching regarding sulfur content, the Examiner has relied upon Heneghan. However, Heneghan teaches that "low sulfur" diesel fuel creates significant fuel/material interaction problems. The problems appear to be related to the formation of peroxides in the diesel fuels during storage, particularly in tanks on diesel trucks which can keep the diesel fuel at high temperatures. As a result of these problems, California has rescinded the low sulfur standard (less than 10 ppm) in favor of a 50 ppm sulfur standard. Heneghan, column 1, lines 45-53.

In view of these teachings of Heneghan, there is insufficient motivation for combining the teachings of Schwab and Heneghan, as alleged by the Examiner. Heneghan clearly teaches that low sulfur fuels are associated with problems caused by the formation of peroxides. Thus, Heneghan provides a teaching away from the use of low sulfur fuels.

Further, even if, for the sake of argument only, the references were combined, there is still no mention by either Schwab or Heneghan of reducing the amount of

peroxides in middle distillate fuels blended with one or more oxygenates by combining the fuel with a hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group, wherein the fuel has a sulfur content of about 20 ppm or less. Because the claimed hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group is not recognized by either Schwab or Heneghan for reducing peroxides, there is no motivation for combining the hydrocarbon additive with a low sulfur fuel to reduce peroxides.

Instead, Heneghan teaches a liquid hydrocarbon stabilizer containing a hindered phenol and a sulfide or phosphine peroxide decomposer that can be added to the fuel to reduce hydroperoxide levels in the fuel. Heneghan, Column 2, lines 20-31 and column 3, lines 28-60. Thus, if anything, one of ordinary skill in the art, looking at the teachings of Schwab and Heneghan, would employ the hindered phenol/sulfide or phosphine peroxide decomposer additives of Heneghan to reduce peroxides.

For at least these reasons, little or no motivation exists for combining the teachings of Schwab and Heneghan in the manner suggested by the Examiner. Without the requisite motivation, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

Cunningham

The Examiner has rejected claims 1-58 under 35 U.S.C. 103 as being unpatentable over U.S. Patent No. 5,405,417 ("Cunningham"), for the reasons provided at pages 4-5 of the outstanding Office Action. Applicants respectfully traverse this rejection.

Independent claim 1 recites a method of reducing the amount of peroxides in middle distillate fuels blended with one or more oxygenates, the method comprising, among other things, combining the fuel with a hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group, wherein the amount of hydrocarbon additive combined with the fuel reduces the amount of peroxides in the fuel as compared with the same fuel without the hydrocarbon additive, wherein the fuel has a sulfur content of about 20 ppm or less.

Cunningham teaches a fuel composition characterized in that it comprises a major proportion of a hydrocarbonaceous middle distillate fuel and a minor combustion-improving amount of at least one peroxy ester combustion improver. Column 1, lines 37-45. The fuel compositions may additionally contain a small quantity of one or more organic nitrate esters. Column 3, lines 43-45.

However, Cunningham does not teach reducing the amount of peroxides in middle distillate fuels blended with one or more oxygenates by combining the fuel with a hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group, wherein the fuel has a sulfur content of about 20 ppm or less. In fact, the addition of peroxy ester combustion improvers in Cunningham would appear to teach away from the claimed method for reducing peroxides.

Further, because the presently claimed hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group are not recognized by Cunningham for reducing peroxides, there is no teaching or motivation for combining such a hydrocarbon additive with a fuel having a sulfur content of about 20 ppm or less to reduce peroxides, as claimed.

For at least these reasons, Cunningham fails to teach or suggest the method of claim 1. Accordingly, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

Regarding claims 10-18 and 23-58, claims 10-18 are directed to a fuel composition, comprising, among other things, that the amount of peroxides in the fuel is less than about 8 ppm. Claims 23-58 are directed to methods comprising, among other things, providing a middle distillate fuel blended with one or more oxygenates, wherein the amount of peroxides in the fuel is reduced to less than about 8 ppm.

As described above, Cunningham teaches a fuel composition characterized in that it comprises a major proportion of a hydrocarbonaceous middle distillate fuel and a minor combustion-improving amount of at least one peroxy ester combustion improver. Column 1, lines 37-45. The amount of peroxy ester employed will generally fall in the range of about 250 to about 10,000 parts by weight of peroxy ester per million parts by weight of the fuel. Preferred concentrations usually fall within the range of 1000 to 5000 parts per million parts per fuel. Column 4, lines 5-13.

Thus, Cunningham does not teach the claimed fuel composition or methods comprising, among other things, that the amount of peroxides in the fuel is reduced to less than about 8 ppm. For at least this reason, Cunningham fails to teach or suggest the composition of claims 10 to 23 or the methods of claims 23 to 58. Accordingly, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

Regarding claims 19, 21 and 22, independent claim 19 recites,

A hydrocarbon additive for a middle distillate fuel containing an oxygenate, the additive comprising a polar functional group and a tertiary hydrogen beta to

the functional group, wherein the polar functional group of the hydrocarbon is selected from the group consisting of the characteristic moieties of the following: alcohols, alkyl esters, carboxylic acids, ketones, aldehydes, amines, amine esters, nitro-, and nitrite-compounds, phenols, and mixtures of one or more of the foregoing.

Cunningham teaches that the fuel may contain one or more organic nitrate ignition improvers. See column 2, line 55 to column 3, line 16. However, Cunningham fails to teach or suggest the hydrocarbon additive of amended claim 19. Accordingly, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

Claims 21 and 22 depend from, and therefore include the limitations of, claim 19. For at least this reason, Schwab also fails to teach the limitations of these claims as well.

### CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 50-2961.

Respectfully submitted,

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